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Address by
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Mr. Chairman, Senator Allott, Governor Love, Governor Hathaway, Governor Williams, Mayor Currigan, Distinguished Guests, Friends.

It is a great pleasure to be in Denver and to see so many friends from industry and the universities in the Rocky Mountain area who have been working with us in NASA in the advancement of research and development in aeronautics and space. I must confess that I feel a little like "this is where I came in". Just about 30 years ago I was here at the Brown Palace with many leaders in aviation like Jimmy Doolittle, Tom Morgan, Casey Jones, Roscoe Turner, John Victory and Bill Enyart, trying to find ways to get the country to move faster in aviation. World War II was approaching. The occasion was the Annual meeting of the National Aeronautic Association. Just as in aviation 30 years ago private citizens and public officials had to work together to build centers of power for good governmental decisions, but outside the formal institutions of government, so must we today in both aeronautics and space. So again we meet at the Brown Palace as members of the American Astronautical Society.

In 1961, when the Twentieth American Assembly met at Columbia University's Arden House on the subject of outer space Dr. Henry Wriston, the American Assembly's President, called that Assembly a "Non-partisan venture in space education". The Assembly's report gave strong support to "the national space

program as an intrinsically valid enterprise" and stated: "Space technology promises to bring about revolutionary changes in man's life on earth".

In 1961 the American Assembly recognized that at the start of the space age the United States did not have the organizational and management capabilities or the disciplinary and technical capabilities required for success. Large efforts in science, in technology and in their application and use were needed.

Today, as we meet in Denver in 1968 the work of the Twentieth American Assembly is being brought up to date in this just-issued volume: Outer Space, Prospects for Man and Society - Revised Edition. This meeting in Denver and this revised report come at a time when the National Aeronautics and Space Administration (NASA) has passed the peak of its first decade of effort. A research and development work force that totaled over 400,000 men and women was built up and used to apply our large accumulation of aeronautical knowledge to space work, to expand vastly our base of space competence, and then to feed back much of the resulting know-how into aeronautics. One-fourth of this work force has already been disbanded as projects such as Ranger, Lunar Orbiter, Surveyor, Mercury and Gemini were completed. A group of 10,000 men and women - scientists, engineers, teachers, and students have been oriented toward space science and engineering, and most of these are currently at work under NASA funding at about 200 universities. The Department of Defense has developed and operates its own satellite communications and other space systems. Our leaders can now call on a well-established and versatile national capability in aeronautical and space-related science, engineering and administration and expect their questions to be answered. We now can point to the profound influence that our space

efforts have had on the geosciences, are having on astronomy, and are beginning to have on the life sciences.

Ten years ago, we were looking forward hopefully to space applications in meteorology, communications, navigation, and geodesy. Today, there are satellite systems and their earth-based components in operation for all of those areas, while still other possibilities are becoming apparent, for example, in earth-resource surveys or world-wide data collection and dissemination.

Dr. Homer Newell, NASA Associate Administrator, has expressed our position in these words:

> "In science we are well on our way toward establishing the basis for investigating major areas of natural phenomena that characterize the universe in the places in space where measurements can best be made with a power and an intensity hitherto unavailable to the researcher. A new generation of researchers who, during their formative years, watched the Space Age unfold are entering the scene. They are caught up in the excitement that space represents. They will undoubtedly bring their enthusiasm to bear not only upon space, but also upon the great challenges of today here on our planet earth, such as the problems of oceanography, earth resources, the cities, transportation, population, pollution, and food. They are likely to oppose efforts to delay or sidestep any of these challenges."

This new generation of researchers is reading and studying volumes like this: "Social Indicators" the second in a series prepared by the American Academy of Arts and Sciences under a NASA grant. In this series Raymond Bauer

and his colleagues examine the impact of the space program on American Society in a time dominated by rapid technological change. They examine in depth the need to anticipate the effects of that impact. The new generation senses that as the space program changes, so will its impacts change, and that the need to anticipate them remains important.

Continuing with Dr. Newell's words:

"Ten years ago, the atmosphere, the oceans, and space were more often thought of as separate rather than as closely related media. Today, these three are beginning to be viewed as an inseparable continuum open to human activity, engendering a broader and more cohesive view of our natural environment, and forcing a reassessment of the dimensions of our political environment."

Because we meet in Colorado, and for many other reasons, I am especially glad that Senator Gordon Allott could be here to give us his views. As an outstanding senior member of Congress, he has devoted careful, detailed and constructive consideration and leadership to the problems and potentialities of the nation's aeronautical and space programs. We in NASA have high respect for his perception, his judgment and fairness. We appreciate the large investment of his time he puts into the Congressional review of our program.

It has also been valuable on Saturday and yesterday to have the opportunity to meet with Chancellor Mitchell of the University of Denver, President Morgan of Colorado State University, President Childs of the Colorado School of Mines, President Carlson of Wyoming University and other university officials. Here in Colorado, NASA has been working closely with the University of Colorado, the University of Denver and with Colorado State University in a wide range

of multi-disciplinary efforts for a number of years. The University of Denver has shown outstanding leadership in providing a focus for bringing together in fruitful collaboration the efforts of industry and academic institutions in the area of the advancement of science and technology generally and in the understanding of their applications and meaning for the broader problems of our society.

To speak of Denver in aerospace matters is to speak of Martin Marietta, a great company that gave the United States the Titan Booster. Not only has Titan contributed greatly to National security but it flew 20 astronauts in 20 months and they all came back safe and sound. Ball Brothers and other Rocky Mountain companies have also made important research advances. To be in Colorado is also to be reminded of that great organization, the United States Air Force. While we all know that the Air Force Academy at Colorado Springs is the mainstay of Air Force education, we also know that the Headquarters of the North American Air Defense Command at Cheyenne Mountain is a mainstay of our national security. We must also recognize that Colorado is the home of the Environmental Science Service Administration and the National Center for Atmospheric Research. We will hear more of these institutions through papers given at this Symposium.

Accompanying me here today is Mr. James Beggs, who has recently assumed the duties of Associate Administrator for Advanced Research and Technology at NASA and Mr. Frank Smith, Assistant Administrator for University Affairs. I am sure that many of you have known Mr. Beggs through his work as Vice President of the Westinghouse Defense and Space Center, but this may be your first opportunity to meet him in his capacity as the man we look to in NASA to take the leadership

in the planning and execution of our work in advanced research and technology. You also have known Frank Smith as a leading engineer and administrator at our Langley Laboratory and as the Director of our 1965 Future Programs Task Force. In the months ahead when we will be flying fewer missions we will be giving our most careful consideration to the research and development efforts needed to provide the concepts, components, and systems that must be built for the future. The work of our office of OART under Mr. Beggs and of University Affairs under Mr. Smith thus assume special importance. At the very heart of the process of technological advance is assurance that research on components, materials and techniques which is focused on the areas of greatest need and promise is not unduly constrained by specific and item system requirements. This is a field and a national necessity on which the industrial and academic institutions of the Rocky Mountain Region might well focus as that in which they can perhaps make their greatest contribution in the years immediately ahead. Mr. Beggs and Mr. Smith are prepared to work with you in this.

As this American Astronautical Society symposium begins its consideration of the future course of the space program and those elements of greatest interest to the Rocky Mountain Region, it may be well to review some of the elements of the general situation today as it affects aeronautics and space.

These are uncertain and unusual times, not only for the space program and for our work in aeronautics but for almost every other important national activity.

The war in Vietnam, the peace talks in Paris, the problems faced by our cities, the economic problems of inflation, of balance of payments, and the uncertainties of an election year -- taken together and interacting -- place

us all in a position from which it is most difficult to chart a clear and certain course for the future. Almost every important national and regional enterprise is proceeding through a series of adjustments and readjustments as our economic, political and social systems move to resolve the problems with which we are faced. And most local enterprises cannot make plans independent of national and regional conditions.

In NASA's aeronautics and space activities adjustments to the needs of these times have taken the form of sharp reductions in our programs and budget. We are conducting the tests and flying out the missions started in the build-up period since 1961 but are not starting new ones, with a very few exceptions. It is already clear, as I have testified in Congress, that with the budget levels we now face for FY 1969, production of the Saturn IB will have to be terminated and that a significant gap in the production of Saturn V will almost certainly be required. It may even be necessary to terminate Saturn V production. I have also testified that it is doubtful that we will be able to proceed with the development of a flight-qualified nuclear rocket engine. We are doing all we can to avoid terminating completely such important activities as the unmanned planetary exploration program, but it is not likely that we will be able to proceed with the Titan/Mars 1973 missions.

We do expect to carry our one flight of the Saturn I Workshop but on a delayed time-table. For a number of years to come, missions to use the manned space flight capabilities developed in the Apollo program will be very limited and Apollo spacecraft production will be curtailed. In aeronautics, the X-15 and B-70 experimental test flights will be terminated, and a number of development projects in short and vertical take-off; supersonic and hypersonic fields will be phased down to an experimental engineering status.

These reductions to a budget which has already been sharply reduced will have many very serious effects on the U. S. position in aeronautics and in space. They are only the most recent in a series of cutbacks and in effect, constitute something like final ratification of a decision that has been in the making since 1966, the decision that the United States will not, at this time, take the steps necessary to continue the advances of recent years. By the end of FY 1969, the work force on NASA projects will be down to just over 200,000, a level ½ that of 3 years ago. As you know, these are not government employees - over 90% of them are in industrial plants and laboratories, so that effects will be widely felt. The totality of the problems our nation faces reaches far beyond NASA. As responsible government officials, we in NASA accept the result of our nation's decision-making processes. We must now direct our leadership and our managerial abilities toward the successful run-out of the programs approved in past years and now nearing completion. We must at the same time adjust our organization, programs, contracts, university grants, and facilities to meet the reductions that have been decided on, and in the process, do all we can to lay a sound foundation for the future.

While no one should minimize the serious consequences that will flow from the decisions that have been made, it is also important as we assess our situation that we recognize a number of significant elements of strength.

One element of strength is that the events of the past few months, while they have not led to levels of support needed in aeronautics and space, have nevertheless shown that there does exist a strong continuing core of important support for research and development in both these fields.

Another element of strength is that the U. S. can now count on a facilities base in the NASA complex valued at over four billion dollars and a know-how in

industry and a competence in science that can be put to work again when the time comes. We now have a management competence in large scale space development that can restore these assets to operational status with a high degree of efficiency.

In the Executive Branch, the NASA budget that was approved for FY 1969, while reduced below previous years, provided support for the essential features of a strong and continuing program. The amount was $4,370,000. The President, in submitting this budget made it clear, as he had when he agreed to the FY 1968 reductions made by the House Appropriations Committee last year that he was doing so reluctantly, that he still believed strongly in the need for a more vigorous program in aeronautics and space, and that his actions were based entirely on the over-riding financial necessities related to passage of the tax bill and to efforts to control inflation.

In the Legislative Branch, the Senate will consider our FY 1969 budget this week. Reductions of $362 million have already been made and the President has accepted these, as he did those of FY 1968. These actions bring NASA down to the $4 billion level. At this point there seems to be resistance to further reductions and a feeling that we should be permitted to move ahead with as effective a program as possible at this $4 billion level. I believe that this view will prevail as Congress takes the final major actions on our budget this year.

When one considers the whole array of problems now facing the Congress and the nation, and the fact that all national programs, needs, and priorities are being adjusted, I think it is significant that the Congress is standing firm at the $4 billion level for the NASA 1969 budget. I think it shows a recognition of the necessity for the country to stay in business in aeronautics and space research. Senator Allott may have more to say on this.

Among thoughtful people in the country at large, I do not find that public support for the space program is declining. Rather we are in a period in which many have been forced by events to focus on other serious needs and problems to a greater degree than in the past. The problems of how we stand in the world, including our position in Southeast Asia, and the problems faced by our cities, have been with us for many years; but it was not until these approached or passed major points of crisis that there was a general recognition that they demand major commitments of resources and attention on a continuous basis over a long period of years. We in space have seen the same thing happen with Sputnik and with Gagarin. This phenomenon has been called "government by crisis". The result is that many people who in the years following 1961 ascribed to the space program a separate, special, top priority status are now realizing, as the national leadership in the space program has understood all along, that the space program must be regarded as only one of a number of essential activities of high priority to which the country must devote substantial resources. In my opinion, what may appear to some to be a decline in public support for the space program is not a changed attitude, but is a reflection of a new awareness of other high priority problems and requirements. This may well lead on to the recognition that many of the other newly-seen problems can only be approached and actions to solve them taken within the framework of NASA's experience with the organization of large scale scientific and engineering efforts. The investments made in NASA may well add greatly to the value of investments we will have to make in these other fields.

Let me make it very clear that NASA is still very much in business, and it will stay in business. We are accepting the challenge of the time and will continue a hard-hitting, technically sound program aimed at the most important objectives of the future. At the same time that we are making the necessary internal adjustments, we will also make every effort to prepare for the longer

term future.

Perhaps, now we should take a look at some of the things we will be doing in the next twelve months.

The Apollo program is moving forward toward the first manned flight, Apollo 7, this fall. We are confident that the vibration and other problems encountered on the second Saturn V test flight last spring will be solved and that we will be able to fly men on the third Saturn V. With success in these two flights, we will proceed down the home stretch toward the end of the decade with a series of Saturn V flights that should enable us to attempt the first manned lunar landing mission by December of 1969.

In space sciences, we anticipate exciting additions to our knowledge of new elements and regions of the universe from the Radio Astronomy Explorer satellite launched on the 4th of July, and also from the Orbiting Astronomical Observatory to be launched this fall. In both cases we will be making for the first time extended astronomical observations in regions of theelectromagnetic spectrum which cannot be effectively made from the earth. This is scientific exploration of the universe in a manner uniquely possible in the space program. It is man reaching out by means of rocketry to learn much that he has been unable to see, and measure, and use in all his past history.

In our steady progress toward connecting such new knowledge to practical use, we will shortly be launching the Applications Technology Satellite. Unlike its predecessors in this series, this satellite will be stablized by gravity gradient devices. Like the others in this series, it will carry advanced experiments for improving communications, meteorological, and spacecraft technology.

Last June, the Nimbus B meteorological satellite had to be destroyed because of a launch vehicle malfunction. This was a stern reminder of the small margin between failure and success in the use of rockets. Because of the importance of the experiments that were destroyed and because there would be a gap of almost two years in our advanced meteorological program we have decided to repeat the Nimbus B mission in the spring of 1969.

In our continuing planetary program, we will be launching two fly-by missions to Mars in the first part of 1969. Hopefully, these will achieve the kind of success we had with Mariner IV in 1965 and give us valuable close-up looks at this planet. These 1969 flights are now largely paid for and are the next steps in a program for the systematic exploration of the planets. Even at our reduced levels, I believe we can follow the 1969 missions with two orbiter missions in 1971, but will probably have to postpone for another year the start of work on the two Titan-launched orbiter and lander missions which we had hoped to fly in 1973.

The examples I have cited will show that NASA will still be in business in FY 1969. But I am sure I do not have to emphasize that the missions we will be flying were initiated three or more years ago. We are approaching the end of our approved flight programs. The number of new projects started each year has sharply dwindled since 1966 and we will soon see years go by when we will have very few flights. We may see a gap of 2 years in our manned flight program after the landing on the moon, and a second gap, equally long, after the Saturn I Workshop.

Perhaps the most fundamental decisions ahead lie in the field of large launch vehciles. Can we gap production of the Saturn V or will we have to terminate it? We and the DOD are looking carefully at the entire national

launch vehicle program to make sure that both NASA and Defense essential needs can be met. This includes re-examination of ways in which NASA can utilize the Titan III in both unmanned and manned programs of the future. We are also examining all factors involved in the development of new and less costly launch vehicles. We will undoubtedly have to consider whether large launch vehicles like the Saturn IB and the Saturn V have served their purpose and to take as a major task for the next period the development of a simpler and less costly launch vehicle for repetetive use. In these considerations we will have to balance the funding requirements for spacecraft to fly on the large boosters we will have in storage against the initial cost of developing new launch vehicle systems that will be more economical in the long run.

Most important of all, in this period we will have to establish as clearly as we can the facts and assumptions on which our executive and legislative leaders can base decisions as to the future course the program should take. In each major area of both aeronautics and space, I believe we must now think not in terms of commitments to particular accomplishments by particular dates, but of so structuring our plans and programs that we can make steady and sure progress toward important goals at rates that can be adjusted to the level of budgetary support that can be provided. This is not the most economical approach; we could accomplish any specific goal more economically if it were possible to have a commitment to support a specific objective and a specific schedule. But in the present national situation it is not reasonable to expect commitments of this type. It is reasonable and essential that our total program receive continuing support at an adequate

level. And it is reasonable for the Congress and the public to expect us, with such support, to be able to plan and conduct an effective program over a period of years, and accomplish significant objectives.

In a period of relatively low flight activity it is especially important that we continue a broad program of advanced research to provide the technology required to support the programs that will be required to meet future national needs in aeronautics and space. I believe that there is a need to reconsider our national policies as they affect the research and educational activities of universities. As one aspect of this, the policy of recent years that university programs of agencies like NASA could be reduced in the expectation of equivalent or increased support from other sources has not yet yielded the needed results. NASA's programs with universities have been broad and varied in nature, and have in sum represented a series of important experiments in government-university and government-scientific community relationships. I believe careful assessment of the results of these experiments will show the merit of continuing in the years ahead the important elements of this kind of broad program of interactions between the universities and NASA.

It is my hope that in the sessions to come this symposium will help us all place in perspective the necessary elements of future aeronautics and space research and development program.

Let me emphasize one final thought. I do not regard the space program as competitive with other national needs or endeavors. The space program has important roles to play in the affairs of our nation. We in NASA, in my view, have a dual responsibility. We must make clear and speak out strongly for

the needs of the nation in aeronautics and space. We must also do all we can to take our share of the responsibility for the totality of the problems which our nation faces.

These are difficult and challenging times. I want you to know that we in NASA will continue to give these problems our best efforts.